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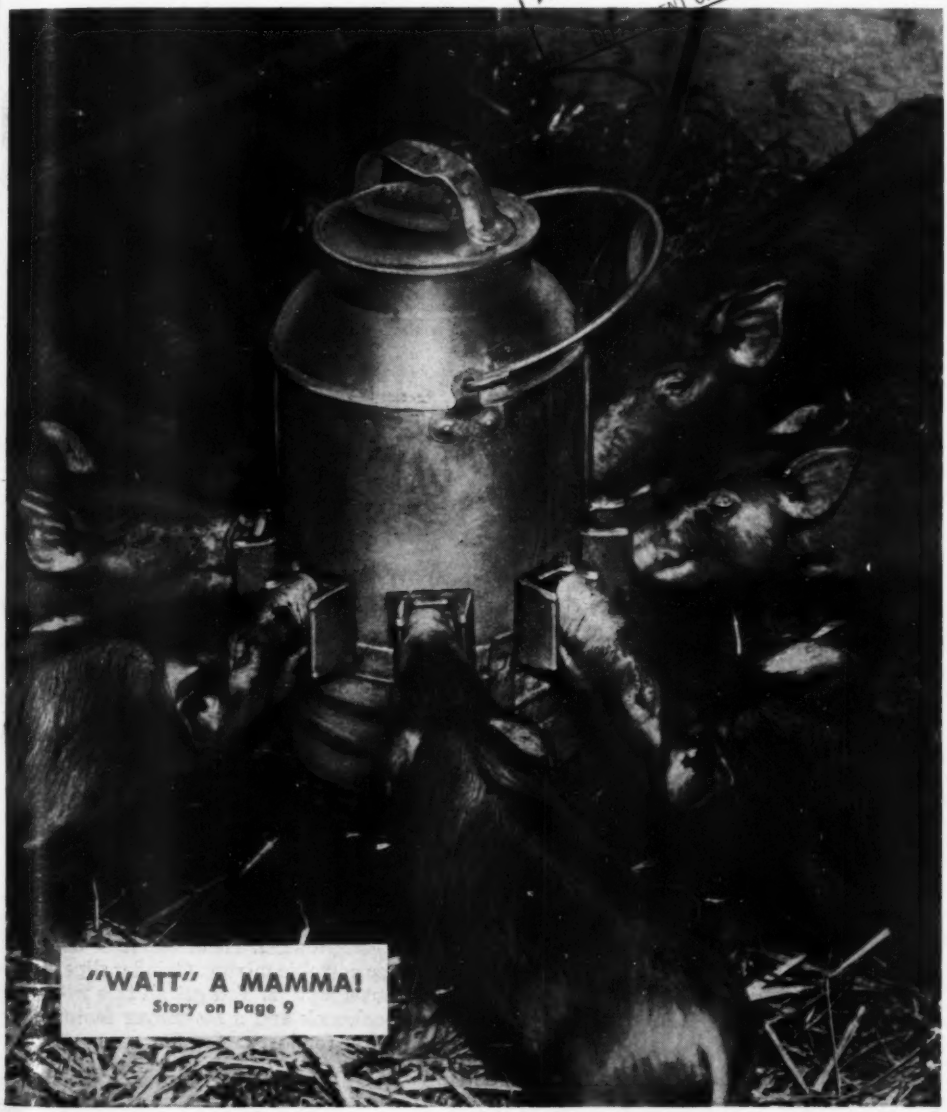
ELECTRICITY ON THE FARM *Magazine*

APRIL, 1956

Progress Report on Hay Drying
Feeders Cut Poultry Feed Costs
Dependable Home Water Heating
Self-Service for Chopped Hay
Fight Frost with Sprinklers . . .

APR 12 1956
DEPARTMENT OF AGRICULTURE



"WATT" A MAMMA!
Story on Page 9

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Mrs. Roy Behm, Peterson Road, Grayslake, Ill., says . . .

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Editor's Chat

HOMEMAKERS HEAVEN

Do you have a little "homemaker" all your own? If so, or if you would like to have one, why not give as much thought and planning and perhaps even money to make the home as comfortable, efficient and easy to work in as you give to your shop or dairy or other business enterprises. A lot of farmers do ventilate the cow stable and chicken house and rig comforting heat lamps over their baby pigs but let the little homemaker work out her own salvation as best she may on a cold floor and in a steamy or perhaps hot and poorly ventilated kitchen. Some of them keep on buying new machinery that in many cases is used only a few days during the year and let the homemaking equipment get out of date and out of condition and still expect it to function daily for the family comfort.

With all the new ideas on comfortable living and all the new electrical appliances to make good living easy and possible it seems a shame for any homemaker to lack the up-to-date equipment necessary to do the job. Every home could be a "Homemakers Heaven" and modern, electrical home appliances are a big help in the right direction.

A FARM WELDER FOR YOU

Some of you have doubtless been busy recently in the farm shop repairing old tools or making new ones for the cropping season so close at hand. If so, and if you lack an electric welder in your shop, the suggestion that you provide yourself with that item will bring the response that you should have had one long ago. That's true for almost every farm shop because the modern electric farm welder is as handy as a pocket in a shirt. It can help you make so many repairs, both large and small, that otherwise would have to be taken to a shop in town. Considering this point alone, a welder soon pays for itself and begins to show a nice profit.

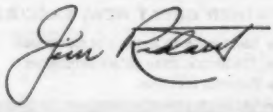
If you are among that fortunate number who have a teen-age boy in a vo-ag course at school where he can learn to weld along with the many other useful things they teach, he will second the motion that an electric farm welder be added to your shop equipment with no more delay. They really are wonderful and almost a necessity on any farm.

WHEN LIGHTNING HITS THE GROUND

When lightning hits the ground that's the end of it. When lightning hits a lightning rod that is properly grounded that's the end of it. When lightning hits anything not properly protected with lightning rods and GOOD grounds that's usually the end of that whether it be building, man or beast.

The same is true to a lesser degree in the case of electric wiring. It is safe and sure if it is adequate and properly installed, which includes proper grounding. It is safer to have a car that won't start than one you can't stop. It is safer to be without lightning and electric power if you lack proper grounds to stop it.

Inasmuch as we have no control over whether lightning comes or not and do not want to be without electric power, the only alternative is to make sure all buildings have lightning protection, have electric light and power, and above all, that everything is properly grounded. All grounds should be inspected and kept in good condition all the time. No one knows when the next storm may come your way. Are your grounds grounded?



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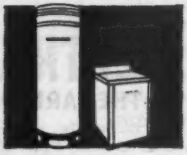

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Division of American Motors Corp., Detroit 32, Michigan

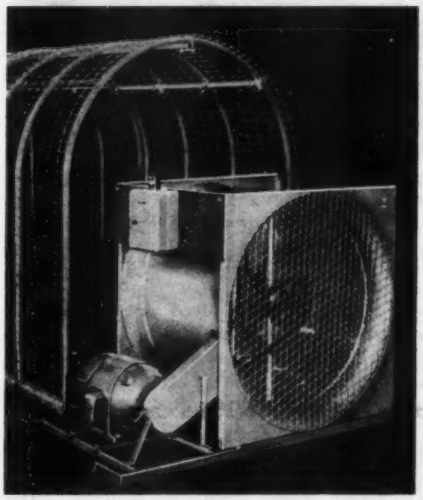
Hay Drying Progress Report

Latest Developments in Equipment and Techniques Provide Artificial Curing for Hay in Any Form

By W. G. BUCHINGER

Hay drying equipment has constantly been simplified and improved since it was first discovered that hay can be cured profitably in the mow.

The duct systems that were originally used required much detailed design, finished carpenter work, a great quantity of matched lumber and considerable time to install. This made the cost quite high and, at the same time, caused the static pressure or resistance to air flow to be relatively high. The newer type of ducts are quite simple, requiring very little design. They are about 75 to 85% open, requiring no finished lumber or skilled labor and very little time to install. This brings down both the initial cost and the static pressures encountered.



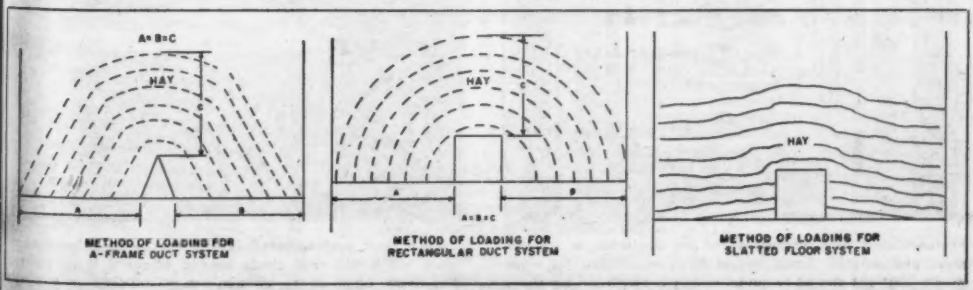
Fans and blowers have been improved. Many manufacturers now build fan, motor, starter and guard all into one convenient portable unit as shown here.

Lower Static Pressures

Lower static pressures mean higher efficiency and less operating cost per ton of hay. These new types of single open main ducts do, however, require more care in placing or loading the hay into the mow. The hay must be loaded so that the depth of hay above the duct is the same as the width of the hay on each side of the duct. In other words, a cross section of the hay mass should form a half circle, with the center of the duct as radius point.

The fans and blowers have also been improved and made more adaptable for the mow duct systems. At first, industrial type fans and blowers were used for curing hay and many of these fans and blowers did not have the proper characteristics necessary for this type of operation, that is one with changing static pressures. Today, propeller type fans are most commonly used because of their constant horsepower requirements at any static pressure as well as their relatively light weight, small size and low cost.

However, with the original propeller fans, a large circular opening, 3 to 4 ft. in diameter, had to be cut into an expensive piece of 1 inch plywood to permit mounting the fan onto the



The slatted "A" frame duct can be used in mows up to 30 ft wide. These frames are easily constructed from dimension lumber.

end of the duct system. Most of the fan manufacturers are now manufacturing hay drying fans that have a square panel frame with a built-in orifice which can be mounted onto the end of the duct system very simply with just four bolts or lag screws. Some manufacturers build the fan, motor, starter and guard all into one portable unit. This makes it easy to move the unit from one mow to another or to connect it to a grain drying system or corn drying system later in the season.

There are six general types of air distribution systems in use today. They are as follows:

• The Slatted or Open Main Duct Type

These systems are built with "A" shaped frames, modified "A" frames, rectangular frames and arched frames. These ducts have become the most popular types due to their simplicity and small amount of material needed. They are made up of a series of frames spaced about 2 ft apart with 1 in by 4 in slats nailed on them. The spacing between slats is about 3 inches but may be as high as 18 inches if the duct is covered with chicken or turkey wire. The rectangular frame can be used for long, chopped or baled hay while the other ducts are best suited for chopped hay. These open ducts run through the center of the mow and form the only air distribution system. These ducts extend from the fan housing to within 6 ft of the opposite end.

• The Open Floor or Slatted Floor Type

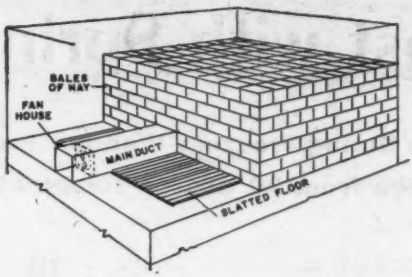
This type has the main air duct located in either the center or one side of the mow. This main duct supplies metered air into a slatted or open floor which is raised 4 to 10 inches above the mow floor and extends to within 5 or 6 ft of the sides and ends of the mow. This system is very efficient and works equally well on long, chopped or baled hay. However, due to the relatively large amount of material required, it is now used mostly for baled hay batch dryers or for very wide mows.

• The Lateral Duct System

The main air tunnel for a lateral duct system may again be located in the center or on either side of the mow with lateral ducts resembling inverted troughs connected at right angles to the main duct. These lateral ducts are spaced about

Prefabricated steel arched ducts are available in various sizes and lengths. Small lateral ducts are added for wide mows. Sections can be removed as hay is emptied from mow.

Closed steel prefabricated lateral duct systems provide a main air tunnel with ducts spaced about 4 ft on center. The ducts, open at the bottom, are raised from mow floor.

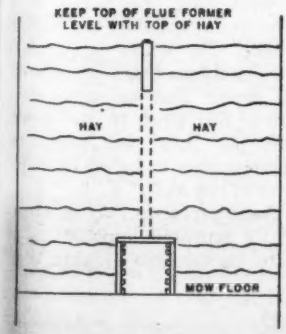


Bales should be placed on drier with broken joints, just as bricks are laid in a wall, to prevent air leakage. Bales should also be looser than ordinarily used for field cured hay.

4 ft on center and extend to within 5 or 6 ft from the sides and ends of the mow. They are open at the bottom and raised 2 to 6 inches above the mow floor. Due to the high labor and material requirements, together with the lower efficiency of this system, it is now seldom used on new installations.

• **Flue Former System**

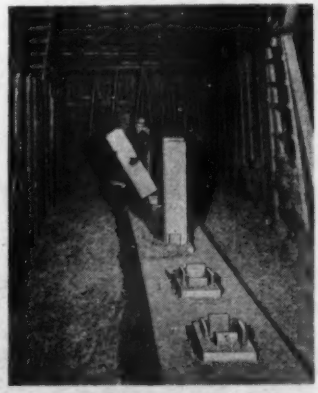
The flue former system is recommended for high, narrow mows. This system has a rectangular main duct through the center of the mow which is slatted on the sides and tight on top with 1 foot square openings along the center line of the top of the duct spaced about 4 ft apart. One foot square flues, 5 ft long, closed at the upper end are fitted into these openings. As the mow is filled, the flue formers are raised so that the tops of the flue formers stay flush with the top surface of the hay mass. Air is emitted through the top opening in the duct and into the hollow column. The closed upper end of the flue former serves as a block and, as a result, air is forced through the hay mass horizontally via the vertical holes formed in the hay by the flue formers. This system is only suitable for chopped hay.



Method of loading for vertical flue former duct. Flue formers, with closed upper ends, are raised as hay is put in mow.

• **Secondary Duct System**

The secondary duct system is also for high mows. With this secondary duct system, a rectangular duct, usually 4 ft by 4 ft or larger, is installed on the mow floor. When the hay reaches a height above the duct which is equal to the distance from the edge of the mow to the side of the duct, the top of the hay is leveled off and a second rectangular duct with a smaller cross-sectional area is layed on top of the hay parallel to and directly above the primary duct. A separate fan and motor is usually installed in the secondary duct.



Flue former duct systems are recommended for drying chopped hay in high narrow mows.

• **Vertical Duct System**

Vertical duct systems are for high, round or octagonal structures. In this type, a square duct or round flue former runs vertically up through the center of the structure. These vertical structures can be designed for self-feeding by installing a cone in the center of the base with a circle of feed bunks around the outer wall.

There are prefabricated ducts now available for each of these systems. Due to the high cost of labor and the depletion of wood lots on most farms, many farmers are finding that it is more economical to buy one of these completely manufactured installations than to build their own duct system.

It must be remembered, however, that the accepted standards recommended by the agricultural colleges and the American Society of Agricultural Engineers for curing hay in the mow apply just as much to a manufactured system as they do to a "do-it-yourself" installation. This applies to the air require-

A secondary duct system may be used in high narrow mows with the smaller duct directly above the main duct.

. . . . . (More on page 32)

Fight Frost with Sprinklers

Continuous Sprinkling During Freezing Weather Protects Plants Against Damage from 20 degree Temperatures

By DONALD R. SISSON

Sprinkler irrigation is being used successfully to protect plants against frost damage during cold spells in late spring or early autumn. Crops have been protected satisfactorily when temperatures have dropped to 20° F. on still nights. Under windy conditions, this minimum temperature is slightly higher.

The plants are protected from freezing in this manner. When the air temperature drops below freezing, water sprayed on the plants starts to form into ice. When the water freezes, it gives off heat. Enough of this heat is absorbed by the plants to prevent them from freezing. As long as water is being applied continuously, the plant remains above its freezing point. For this reason, the irrigation system must be operated continuously during the period when the air temperature is below freezing and until all the ice has melted off the plants by above-freezing temperatures.

Above: Close-up of tomatoes protected from freezing with sprinkler irrigation. Continuous spraying formed thick layer of ice. After ice melted, plants were found to be healthy, vigorous, and undamaged by freezing temperatures.

Right: The onions in left foreground and peppers in right background were saved from early frost damage by sprinkling continuously during freezing temperatures.

Utilize Irrigation Equipment

Most growers who have used sprinkler irrigation for frost control have adapted the same equipment that is used for dry weather irrigation. In practicing irrigation for frost control it is recommended that the grower be on the alert whenever the minimum temperature forecast is 40° F. or lower. The equipment should be set up in the field and given a "test run" before it is needed for frost control. An irrigation system that will not operate when needed cannot protect the crop.

The irrigation system should be started when the temperature drops to 34° F. at plant level. Some sleepless nights might be avoided by the use of a temperature alarm placed in the field at plant level so that the operator may relax until time to start the system.

For frost protection it is necessary only that the wetted diameter from one sprinkler barely overlap the next sprinkler. A larger area may be covered by using a triangular pattern of sprinkler settings and increasing the sprinkler operating pressure. Uniform application of water is not as critical for frost control as for regular irrigation. Some growers plug one nozzle of a two-nozzle sprinkler to further reduce the water application rate. Michigan State experimentors report that an application rate of one tenth to one eighth inch per hour was adequate. Their studies included temperatures as low as 20° F.

Some problems may be created by repeated applications of water on successive nights. Wat-

Irrigation equipment set up and used in this squash field kept freezing temperatures from injuring these fruits.

er-logging of the soil and leaching of fertilizers, especially nitrogen, may result. Since a high rate of water application is not necessary to control frost, the water application rate can be reduced as compared to normal irrigation. This reduction helps alleviate the water-logging.

Continuous Operation Important

Trying frost control with irrigation for the first time, the irrigator is usually somewhat horrified and ready to give up when ice starts accumulating on the plants. He is pleasantly surprised the next morning when the air temperature has risen above freezing; the ice has all melted from the plants; and the crop has been saved.

Many strawberry growers in northern Indiana, Michigan, and other areas are finding that their sprinkler irrigation systems are almost as useful for frost control as for watering the crop. During the spring of 1954, eight to eleven consecutive nights of killing frosts were reported in these areas. Those that irrigated for frost control during these periods reported that irrigation was the difference between a good strawberry crop and a near failure—perhaps the difference between 400 or 100 crates an acre.

Saved Strawberry Crop

Jack Spreuer of Howe, Indiana, used his sprinkler irrigation system for frost control on one acre of strawberries during the spring of 1955. He reports that the net worth of the irrigation for frost control was $400 for this one acre. Spreuer used the same equipment that he uses to irrigate pasture for his dairy cow herd. He reduced his water application rate by spacing the sprinklers farther apart than for normal irrigation.

S. B. Scott of Franklin, Indiana, saved an acre of early set tomato plants when six consecutive nights of killing frost occurred during the first week of May, 1954. Many other growers have experienced as good or better results than Speuer and Scott.

How about using this practice to protect other crops? Michigan State University reports that tomatoes, peppers, peas and broccoli have all been protected from fall frosts in experimental work. Other crops on which frost protection by irrigation may be successful are cucumbers, beans, squash and cranberries. Frost protection need not be limited to the spring months; it may be valuable also during early fall frosts.

Generally, tree fruits and tall slender plants such as corn, pole beans, gladiolus and hyacinths are not adapted to this method of frost control, because of the heavy ice load that builds up on the plant during low temperature frosts. Most growers report some success on these crops to temperatures as low as 27° F. but below that the ice load causes breakage of the plants.

A last word of advice to the grower practicing frost control—**Don't give up!** Be wary of frost on succeeding nights until the danger is past. The work of several nights may be lost if the irrigation system should fail on only one frosty night.

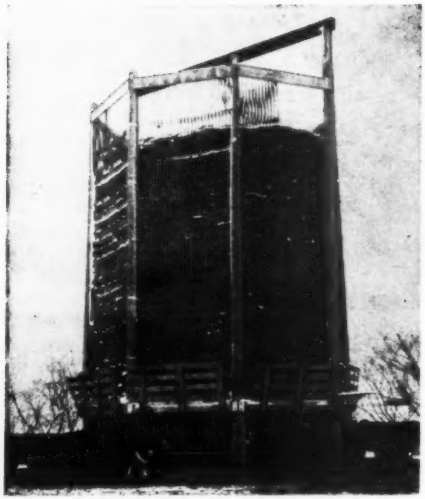
"Watt" a Mamma

Baby pigs can get along without their mothers now, thanks to the electrical device shown on our cover. This self-feeder provides a supply of warm milk, whenever the pigs need it.

The unit consists of an 8 quart round milk kettle with 8 nipples spaced around the lower sides. A 330 watt thermostatically controlled heating element maintains the milk at the proper temperature round the clock. A sow's milk replacer formula is used to provide the proper nourishment for the pigs.

The unit is ideal for raising orphaned pigs, runty pigs, pigs from oversized litters and pigs from sows who fail to provide sufficient milk for their litters. The unit can also be used to take care of orphaned lambs.

The "Pigsaver" as this unit is called commercially, is manufactured by the Norwood Products Company of Luverne, Minnesota.



Cattle are allowed to self-feed. Control gates are used to limit amount of hay fed and to insure even use all around the feeder.

Self Service for Chopped Hay

Vertical Structure Stores, Dries, and Feeds Forage With Minimum Labor

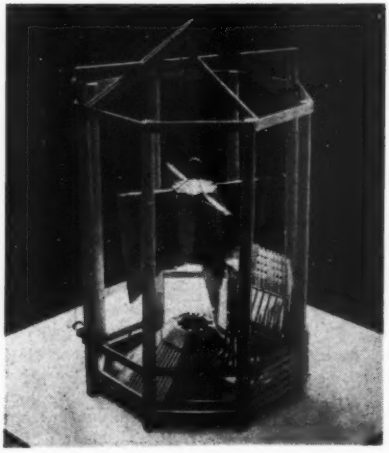
By GENE C. SHOVE
and
RALPH W. HANSEN

Donald Pratt, Glidden, Iowa, completed the mechanization of his hay harvesting by building a hay storage structure which handles his hay with a minimum of labor. The storage holds approximately 50 tons of chopped hay, uses forced air for drying and self-feeds to the livestock directly from the storage. This self-feeding hay storage almost completely eliminates manual labor in handling his hay when used with a mechanized system of harvesting the hay.

Agricultural engineers at Iowa State College developed the original design of the self-feeding hay storage structure as a practical solution to the problem of self-feeding chopped hay. The upright, cylindrical form of storage incorporates the following design features to give it a positive self-feeding action: (1) a taper from top to bottom of the structure to relieve sidewall pressure allowing hay to flow down easily, (2) a cone in the base of the structure to cause the hay to flow out within easy reach of the cattle at the mangers, (3) the use of swinging vertical guards on the manger to permit maximum reach to the cattle in feeding, (4) a movable duct former to make an unlined air duct in the center of the hay, and (5) the formation of vertical cleavage planes in the hay to allow it to separate and flow over the cone.

Pole Framework Used

The main framework of the structure is formed by eight poles placed in the ground at a slight angle. This forms a structure with a tapering diameter about 1 foot smaller at the top than the bottom which helps to relieve sidewall pressure as the hay moves down. A bottom diameter of 18 to 24 feet can be used, depending upon the amount of storage necessary. Pratt selected a 22-foot diameter and a height of approximately 30 feet to provide storage for about 50 tons. Snowfencing fastened to the inside of the poles



This scale model of the self-feeder shows the pole framework, snowfence siding, slated cone, air duct former with dividing fins, drying tunnel for fan, feeding mangers and gates.

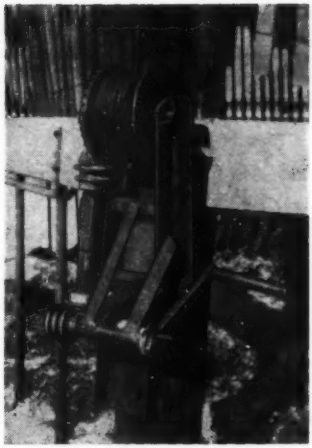
forms the sidewalls to hold the chopped hay in place. The fencing can be most easily attached to the poles during the first filling operation. Fastening the fencing to nailing girts will make a good secure job which will insure that the fencing stays in place for following seasons.

Pratt provided swinging vertical stanchions around the lower portion of the hay storage to allow the cattle to reach into the feeder as far as possible. These were made by hanging short lengths of 1½-inch salvaged pipe about 5 feet from the feeding floor with a spacing of about 15 inches between each pipe. The lower ends of the pipes are connected with a continuous chain and rest on the planks which form the sides of the feeding manger. A continuous chain is secured to each pole and to the center of each manger plank to keep the cattle out of the structure.

Vertical Air Drying Duct

A cone with a 45° slope was built in the bottom of the structure. A slatted wood surface was used on the cone to provide a smooth surface for the hay to slide on and to allow the drying air to pass through the cone for drying the surrounding hay. The lower edge of the cone extends to within 24 to 30 inches of the manger which allows the cattle to reach the hay resting on the lower one-third of the cone. On one side of the cone, provisions were made to attach the air duct for the drying fan.

A duct former, approximately 48 inches in diameter and 8 feet long, was pulled up through the hay during the filling operation. This formed an opening in the center of the hay which served as an air duct for the drying operation, eliminating the need for the construction of a permanent air duct. Four plywood fins attached to the duct former formed vertical cleavage planes in the hay. These cleavage



A hand winch is used to raise the center duct as hay is filled in. This one was built by Howard Hugg, West Side, Iowa, in his farm shop.

planes allow the hay to break apart and slide down the cone as hay at the bottom of the cone next to the manger is eaten. The duct former and dividing fins are suspended from overhead by a steel cable. A winch installed on one of the poles is used to raise the duct former and dividing fins as the hay is blown into the structure.

Hay to be placed in the self-feeding storage structure is allowed to field cure to a moisture content of 30 to 35 percent. Very little leaf loss or shattering occurs when hay is handled at this moisture content. Saving all the leaves means better quality hay as well as harvesting more tonnage. The drying fan should be started immediately after filling has begun. This is an important point since the lower layer of hay will be compressed as the structure is filled and may not dry properly if the fan is not started immediately.

Dry Down to Twenty Per Cent

Forced ventilation is continued until the hay is brought down to a moisture content of about 20 percent. Since the moisture is removed from the inside out, the drying will be completed when the outside layer is down to a safe moisture range. Before the fan is removed, the hay should be checked for complete drying. Shut the fan off for a few days and then start it again and check the air coming through the hay. If there is any evidence of warm hay, the fan should be run for a while longer until the moisture content is lowered to a safe storage range.

The hinged gates which lower over the manger can be used to control the quantity of hay consumed and to control the feeding on all sides of the feeder to insure having an even amount of hay eaten all the way around.

As the cattle eat the hay resting on approximately the lower one-third of the cone, it will begin to separate at the cleavage planes and move down the cone and out toward the manger. The hay will continue to slide down the cone as it is eaten and self-feeds with very little wastage.

This 50-ton hay-keeper is equipped with a 5 hp fan. The owner, Donald Pratt of Glidden, Iowa, puts hay in at 35% moisture content and dries it down to 20% for safe storage.

Neff and the trucker watch as the six inch auger elevates shelled corn into 3,200-bushel overhead grain bin. The entire 250 bushel truckload will be unloaded in less than 30 minutes with this 2 hp unit.

Simplified Grain Handling

Auger Conveyor Helps Turkey Farmer Save Time and Money Feeding 10,000 Birds

By **PAUL R. ANDERSON**

Doing work the easiest, cheapest, and quickest way has become the aim of all businesses in recent years. This is especially true in the business of farming. Feeding on the farm has always involved a lot of time and labor. Anything that can be done to simplify it is money in the bank.

Herb Neff, owner of Neff Turkey Farms, Flat River, Missouri, has devised a way to save about 2½ hours besides a lot of manual labor each time he feeds his flock of 10,000 to 12,000 birds. By anyone's calculation, feeding this many turkeys is a man sized job. Here is how he accomplished this savings:

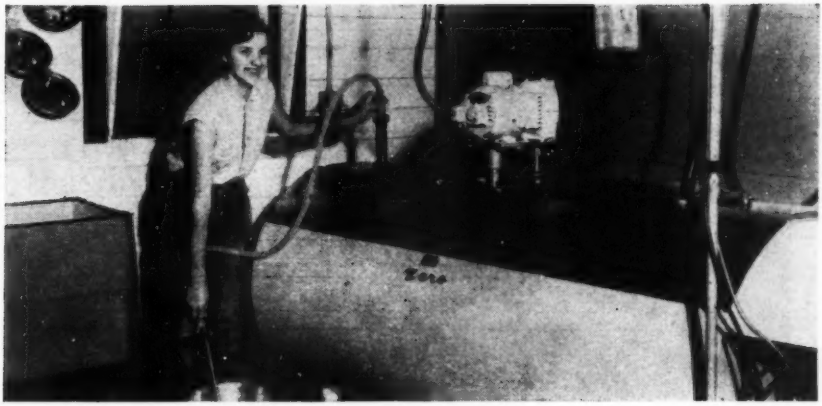
With his old method of feeding, Neff handled the feed three times. It was hauled onto the farm and unloaded. Then, on feeding days, it was loaded back onto the truck, hauled to the feeding area, and unloaded into the feed bunks.

Trucker tilts truck bed to make tail end of load more easily available to grain auger. The entire load is unloaded without shoveling.

Overhead Storage Bin

With his new system, Herb uses a 3,200 bushel feed bin elevated so that a truck can pull under it for loading. The bulk feed is delivered by truck and elevated into this overhead bin. He uses a six inch auger conveyor, 24 ft long and powered by a 2 hp electric motor, to move this grain from the truck into the bin. The auger elevates grain at the rate of 25 bushels per minute. At feeding time, the truck moves under the storage bin and is filled merely by opening the gravity feed spout. Then it is moved to the feed bunks.

This new method has eliminated the loading and unloading of a truck load of feed by hand and accomplishes the job in one third of the time that it formerly required. Neff says this labor savings will defray the cost of the new grain bin in a year's time.



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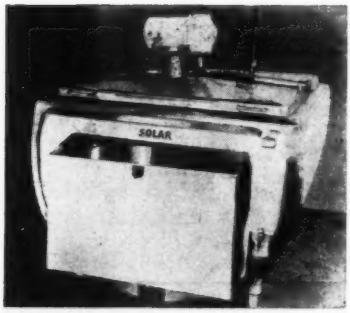

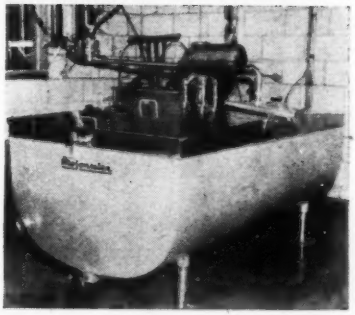

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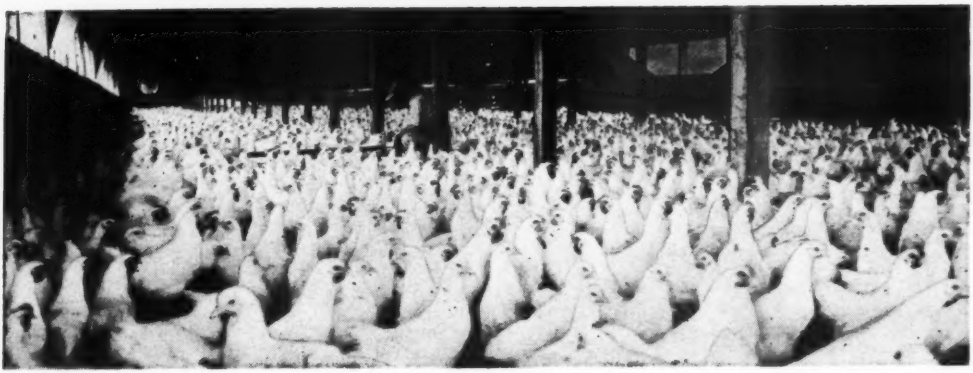


Feeders Cut Poultry Feed Costs

Electric "Hired Hands" Reduce Feed Conversion Factor and Minimize Labor Requirements

By ROBERT VARVIL

Feeding over 40,000 chicks a year requires a great deal of labor and a lot of expensive feed. However, Curnel Richardson of Spencer, Indiana was able to minimize both of these problems when he installed automatic chicken feeders. He not only was able to cut his feeding time down to 15 to 20 minutes a day but was able to save up to 40 tons of feed per year.

Richardson raises four batches of 10,000 to 12,000 broilers a year. His hired men are two ½ hp electric motors. These motors drive two automatic chicken feeders which supply feed to 960 ft of trough. The only labor required for his feeding operation is filling the hoppers twice a day, which usually takes 15 to 20 minutes.

The automatic feeders are controlled by a time switch that turns them off at night. Richardson says he lengthens the feeding period from 16 hours a day for baby chicks to 20 hours a day at market time. No hand feeders are used since they require too much labor and feed is wasted. Richardson started by using some hand feeders but says he couldn't afford to keep it up.

Another big savings resulting from automatic feeding was in feed costs. A study of the records on this broiler operation shows that the feed conversion factor dropped from 3.30 to 2.69 with the installation of automatic feeders. The feed conversion factor is the pounds of feed required to produce a pound of meat. In Richardson's case this amounts to around 40 tons of feed per year. He attributes this savings to two factors. First, the birds have a supply of feed before them at all times which

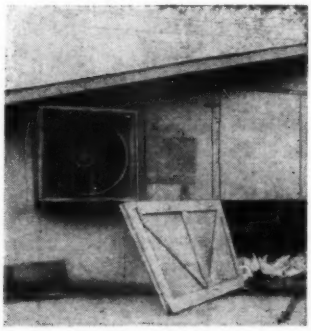
Richardson sets the timer which controls the operating periods of his automatic feeders. Two units handle 10,000-12,000 birds.

makes for increased efficiency. Second, he believes the waste of feed is reduced considerably.

Richardson's system for reducing the waste of feed is very simple. He installed rods over the entire length of feeder troughs to keep the chicks from roosting on them. He also uses 15 lb. felt roofing paper under the troughs to catch any feed that is billed out. Feed on this black roofing paper is noticed by the birds and they eat it. Consequently less is lost in the litter.

Ventilation Also Important

Good ventilation is essential to a successful broiler operation according to Richardson. Two 36 inch fans driven by ½ hp electric motors constitute his ventilation system. During winter operation air is exhausted. A time switch turns the fans on for three minutes and off for seven minutes. This assures a supply of fresh air without drafts. During summer operation the fans are reversed to blow air into the house. With his ventilation system there is no collection of moisture during the cold months. The litter is always dry.

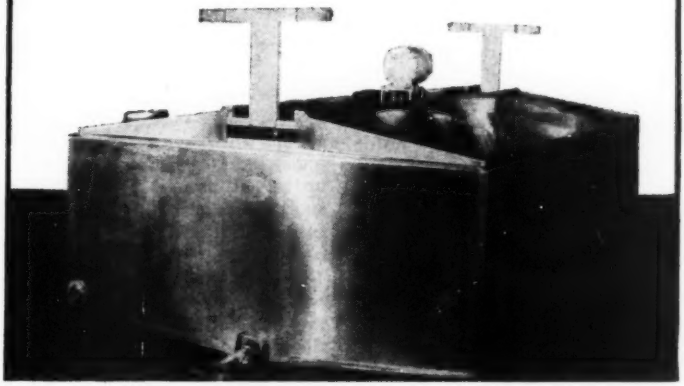


Richardson uses two of these 36-inch fans to keep the litter dry in winter and provide plenty of fresh air for the birds during hot weather. Since installing the fans, he markets an average of 800 more birds per batch.

It is all summed up very nicely by Richardson when he says, "I couldn't afford to raise chickens without ventilation and automatic feeding."

"You can't beat this bulk milk system"

SAYS HARRY NEVERETT, CHAZY, N. Y.



Before February, 1953, it took between four and five men to handle the can operation on Mr. Neverett's 150-head Holstein farm. When the Stainless Steel bulk milk tank was installed in February, 1953, milking became a *two* man job, and the bacteria count dropped from 100,000 to 20,000.

According to Mr. Neverett, "The milk temperature drops to about 37° within two or three minutes after milking. Actually, you can say it cools as fast as we can milk. Butterfat count is up about a point, and I save about 1% on spillage and stickage alone. I figure my bulk milk tank pays off at about 25¢ per cwt., and it's a lot less trouble."

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All About Electric Motors—Part IV

Connecting the Motor to the Load and to the Electrical Service

By ROBERT H. BROWN

Installing an electric motor involves connecting it to the equipment to be driven, mounting the motor, and connecting it to the electrical service. In certain instances it is also necessary to add a special ground wire for the frame of the electric motor.

Direct Drive Connection

On today's farms the electric motor is connected to its load by **belt and pulley** or by **direct drive.** Of these two, the belt and pulley is most often used because it provides a means of securing a machine speed different from the motor speed, is less expensive and in general makes the mounting job easier. The electric motors for farm use normally run at speeds of 1725, 1740 or 1750 revolutions per minute (rpm). They can be purchased with other full load speeds such as 3450 or 1150 rpm but these would be the exception rather than the rule. The majority of farm equipment operates at speeds less than 1750 rpm so a belt and pulley is the only choice. However when the motor speed and equipment speed are to be the same, a direct drive such as that shown in Figure 18 can be used. When considering a rigid type coupling (Figure 18c) it is best to buy one that has non-rigid material between the two halves of the coupling, thereby providing for some flexing action. It is practically impossible to keep shafts in perfect alignment and if the coupling was entirely rigid excessive bearing wear would soon ruin the motor.

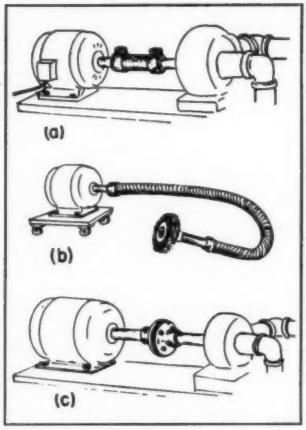

Fig. 18. Three types of direct drives for farm motors. (a) hose and clamp, (b) flexible shaft, and (c) rigid flange.

Belt Drive Connection

Although some flat pulleys and flat belts are in use, most farmers prefer V-belts and V-pulleys for the job of coupling an electric motor to a load. They are easier to install, stay on better, the pulleys can be mounted closer together, less belt tension is necessary, and there is a ready supply available in most hardware and electrical stores.

In selecting pulley sizes it is necessary to know the motor speed (see the nameplate) and the desired speed for the equip-

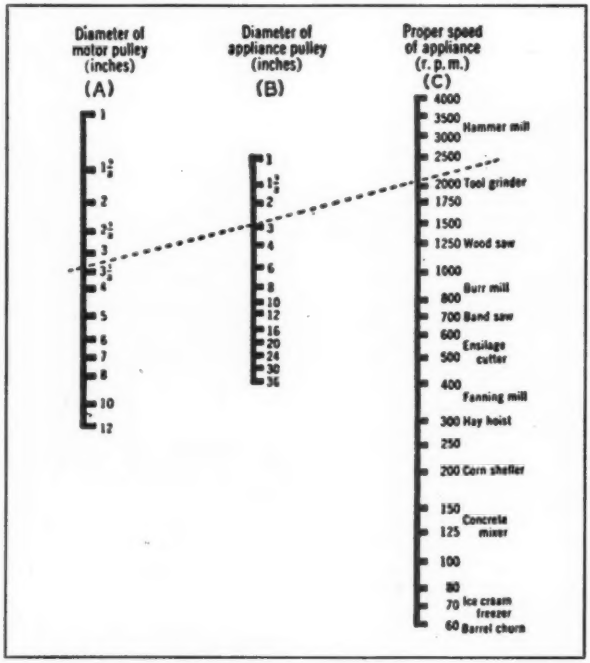

Fig. 19. Pulley Selection Chart. If desired speed of appliance is known, lay straight edge from that point on line "C" to approximate point on "B" or "A" to determine pulley size.

ment (see the nameplate or write the manufacturer). Next assume a motor pulley size of 3 or 4 inches diameter. Then refer to the chart shown in Figure 19, and lay a straightedge on the chart so that a straight line may be drawn from the motor pulley size (say 3-inches) to the equipment speed (say 875 rpm). The place where this line crosses the line B gives the diameter of the equipment pulley (in this instance 6-inches). If the machine operates at less than 200 rpm, a jackshaft should be used to reduce speed. This chart is made for motor speeds of 1750 rpm but can be used with satisfactory results for speeds of 1725 and 1740 rpm. A smaller equipment pulley results when a smaller motor pulley is chosen (say 2-inches) but belt slippage often causes trouble if a pulley is too small. Two inches is about minimum for a motor pulley, especially for motor sizes of ½ hp or larger. For all size pulleys the bore of the pulley must match the size shaft on which it is to be used.

Belt Length and Adjustment

If the motor is to be mounted in a certain place the best way to obtain the length of V-belt required is to tie a string around the pulleys so that the string length will be the belt length. After the string is tied in place, cut it, measure its length and that is the length of belt required. If the motor position is relatively unimportant a length of belt equal to 7 times the diameter of the largest pulley is satisfactory. The number and type V-belt needed are selected from Table 3 and after the belt section (A, B, or FHP) is selected, choose a pulley having a groove which matches the belt section (A, B, or FHP).

When mounting a motor in a permanent position always have some provision for tightening and loosening the belt. The slotted holes in the motor base may be sufficient. If not, elon-

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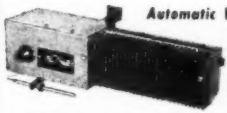

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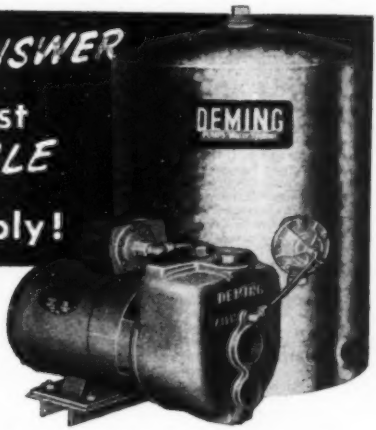

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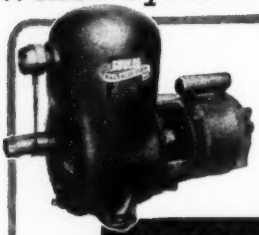

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TABLE 3. Number and Type of V-belts Recommended for 1750-rpm Motors

Diam. of Motor Pulley in Inches	Size of Motor — Horsepower							
	½ or smaller	¾	1	1½	2	3	5	7½
2	FHP*	FHP*						
2½	FHP*	FHP*						
3	1-A	1-A	1-A	2-A	2-A	3-A	5-A	8-A
3½	1-A	1-A	1-A	2-A	2-A	3-A	4-A	7-A
4	1-A	1-A	1-A	1-A	2-A	2-A	3-A	5-A
4½	1-A	1-A	1-A	1-A	1-A	2-A	3-A	5-A
5	1-A	1-A	1-A	1-A	1-A	2-A	3-A	4-A
5½	1-A	1-A	1-A	1-A	1-A	1-B	2-B	3-B
6	1-A	1-A	1-A	1-A	1-A	1-B	2-B	2-B
7	1-A	1-A	1-A	1-A	1-A	1-B	2-B**	2-B
8	1-A	1-A	1-A	1-A	1-A	1-B**	1-B	2-B

* FHP—(Fractional horsepower) a belt designed for small pulleys and small motors. Most commonly available in ⅜-inch width but also available in ½- and ⅝-inch widths.
** The same number of type A belts could be used instead of type B.

gated holes in the member on which the motor is to be mounted furnish a sufficient amount of movement. When placing the belt on the pulleys never force it on, always use the adjustment provided by the slotted holes. The pulleys should be as near in line as possible. A straight board or a carpenter's square placed against the outside surface of the pulleys can be used to check the alignment. Poorly aligned pulleys cause excessive wear on the belt and added strain on the bearings.

Electrical Connection

Electric cable rather than single wires is suggested for connecting the motor to the electrical service. The cable from the existing service entrance switch to the motor may be selected from Table 4. As shown in Figure 20, it is good practice to use type NM cable (or type UF if damp locations) up to the motor control and to use type S service cord from the control to the junction box of the motor. For 115-volt motors, use two-wire cord and cable which includes a bonding wire. (This wire will either be uninsulated or will have green insulation.) For 230-volt motors, use three-wire cord and cable. The extra wire in both instances is for the purpose of grounding all metal parts of the switch and motor. An alternate method is to use two-wire cord and cable for either 115-volt or 230-volt motors and to install a separate wire for grounding. This extra wire may be a bare wire or may have green insulation. It is connected

TABLE 4. Wire Sizes For Installing Electric Motors

Rated Voltage of Motor	Motor Size	DISTANCE-SOURCE TO MOTOR	
		75 Ft. or less	75 to 150 Ft.
(Volts)	(hp)	(Wire Size-gage)	
115	1/6 to ½	No. 12	No. 10
115	Best not to use motors larger than ½ hp on 115 volts		
230	1/6 to ½	No. 14	No. 12
230	¾ to 2	No. 12	No. 10
230	3	No. 10	No. 8
230	5	No. 8	No. 6

from the metal frame of the control and the metal frame of the motor to the electrical ground. In most instances a cold water pipe is the electrical ground. In other instances an 8-foot driven ground rod serves as the ground. In addition, the service entrance switch of the building contains an electrical ground connection and the wire may be joined there if the switch location is more convenient than a water pipe or rod.

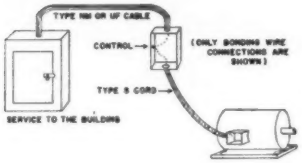


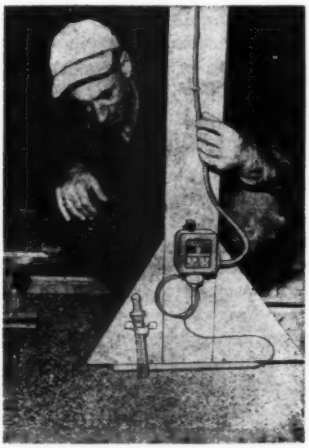
Fig. 20. Typical arrangement of electrical connection for farm motor.

The connections to the motor leads are given either on a tag, in the literature packed with the motor, or on a plate fastened to the motor. Both 115-volt and 230-volt electric motors for farm use have only two wires connecting to them. (An exception is the three-phase motor). Therefore, if a motor has only two leads extending from inside its frame, these two leads are connected to the two wires from the service entrance and no diagram is necessary. Motors which can be operated on either 115 or 230 volts are called dual-voltage motors and it is important to check their connections carefully. There will be four motor leads to identify and either one or two connections to make with these leads before connecting the two wires from the service entrance.

Illustrations used in this article are from the publication *"Selecting Farm Electric Motors, Controls, and Drives"* issued by the Southern Association of Agricultural Engineers and Vocational Agriculture, Barrow Hall, Athens, Georgia.

Brooder Thermostat Storage

Harry T. Van Demark of Walpole, N. H. uses a thermostat control switch in his brooder house. It controls the furnace and pump of the under floor hot water radiant heating system used to keep the chicks comfortable. In order to have sensitive control, he wanted the sensing bulb in the area where the chicks live. To accomplish this, he mounted the entire thermostat unit on a hinged board. Later, when the birds are larger and auxiliary heat is no longer needed, he can swing the control up to the ceiling where it is out of the way and safe from damage.



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Kitchen Requires Largest Supply

The kitchen is probably the most frequent user of hot water. Clean dishes guard your family's health. Detergents loosen the grease, but its hot water that kills bacteria, and allows dishes to dry quickly. Hot water is especially important if you now own, or are planning to buy, an automatic dishwasher.

Hot water is needed to provide adequate germ protection when doing the family laundry. Soaps and detergents are more effective in hot water. Washing is easier and safer when the hot water supply is adequate.

Nothing makes you feel better and cleaner than a relaxing soak in a hot tub, or a quick and refreshing hot shower. The grime and tension of the day's toils disappears down the drain, and a cleaner and more relaxed "you" appears.

Selection of Heater

Since hot water is so essential to our good health and every day living, the selection of a good, modern water heater should be given a great deal of thought. A good water heater should provide adequate hot water for all your family's needs. It should be safe, clean and economical to operate.

An automatic electric water heater is one of the most dependable servants any home can own. It is as safe and as clean as an electric light. No worries about fumes, leaky flues, overheated storage tanks or other fire hazards. Since electricity is doing the job, your home is free of dust, soot and greasy film.

Heater Construction

Electric water heaters have certain characteristics in common, regardless of shape, size, or manufacturer. Their physical make-up could be compared to the construction of a thermos bottle. An inner tank stores the hot water. This tank is separated from the outer enameled case by a thick layer of insulating material, usually "Fiberglas" or rock wool. This insulation maintains the water temperature. By keeping heat loss at a minimum there is a substantial savings of electric current. The insulation also serves to keep the outer surface of the heater cool to the touch.

Inner linings of the water tank are made of many materials. The most common are galvanized iron or steel, stainless steel, glass-lined steel, and copper. One manufacturer makes this inner lining out of stone. Protection against tank corrosion in metal tanks is sometimes provided by a magnesium bar suspended in the water. This bar attracts corrosive elements in the water away from the walls of the tank to the bar itself.

Heating Elements

The method of heating water in an electric heater is simple. One or two electric elements may be used according to the size of the tank. These elements are either immersed directly into the water, or encircle the inner tank on the outside.

Where excessively hard water is found, a heater with a wrap-around element would probably be more efficient. Wrap-around elements cover 4 to 6 times more heating area than immersion ele-

ments and so can operate at a lower temperature. Operation at lower temperatures reduces the scaling and corrosion caused by heating hard water and, therefore, allows for greater efficiency.

Thermostat Controls

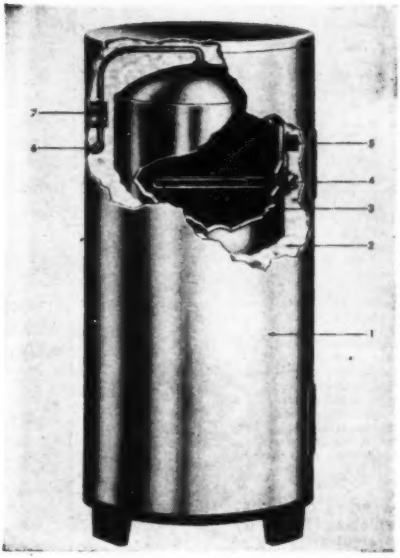
Electric water heaters are controlled by an adjustable thermostat. A 150° temperature is usually recommended for the most efficient operation of such appliances as dishwashers and washing machines. However, any water temperature setting from 120° to 180° is possible. Once a thermostat is set you can forget it. Automatic operation takes over and supplies abundant hot water all year round. No valves to adjust, no controls to bother with. Many electric water heaters have an additional safety feature—the over-temperature control. This control automatically shuts off the current if, for any reason, the water temperature should rise to around 195°.

Size Needed

"What size water heater should I have to assure adequate hot water for my family's needs", is a frequently asked question. Units are available in sizes ranging from 30 to 80 or more gallons. Authorities recommend a 15 gallon capacity per person. Thus, a 50 gallon tank would be the minimum size for a family of four. That same family of four, with an automatic washer or dishwasher, would do well with an 80 gallon water heater.

Installation

Electric water heaters are available in round or square upright models and in table-top models. These units may be installed anywhere in the home. All that is needed is a 230 volt circuit and normal piping. Since the area of greatest use is usually the kitchen or laundry there will be less heat lost through the pipes if the unit is placed either in or near these areas. Of course, no special ventilation or chimney connections are needed. Heat and store your water right where it will be used.

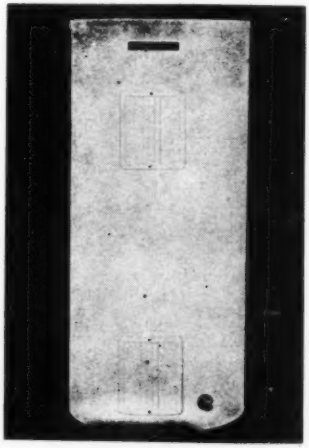


Cut-away view of electric water heater: 1. Outer steel jacket. 2. Heavy insulation keeps water hot and outer surface cool. 3. Water tank—lined with galvanized iron or steel, copper, stone, stainless steel or glass. 4. Heating element—may be immersion type, as shown, or wrapped around outside of water tank. 5. Heavy duty thermostats—adjustable to any temperature between 120°F. and 180°F. 6. Water outlet. 7. Electrical outlet box.

Quick Recovery Units

Something new, this past year, is the quick recovery water heater. According to USDA, these heaters are being installed in many farm homes.

Quick recovery heaters are most frequently found in the 40 gallon size. Two high wattage elements, of approximately 4500 watts each, are responsible for the rapid heating of smaller quantities of water. After the hot water has all been drawn from the tank, it takes only about 30 minutes to get enough 150° water to take a shower or wash dishes. Families who have used the quick recovery electric water heaters are enthusiastic about their performance. "Good things come in small packages," is an old saying that could be well applied to this new heater. Even with its small size, it is satisfactory for most families.



Automatic up-right electric water heaters come in sizes from 30 to 80 or more gallons.

Consult Power Supplier

Before you decide definitely on the electric water heater you will need, consult your local electric power supplier. There will be different requirements and recommendations concerning installation and size. These must be followed to take full advantage of an economical operation. Regardless of the type chosen you can be sure of safe, dependable service, at only a few cents a day, when you install an automatic electric water heater.

Don't drink POLLUTED WATER!

Polluted well, spring or creek water often looks good, tastes good—yet is as dangerous as a drink of poison!

The Sepco all-electric Ultra-Violet Sterilizer purifies even badly contaminated water to Public Health standards. Treats up to 400 gallons per hour. Connects to any water supply system. Cut-away view shows exclusive design with 4 special radiation tubes extending through 6-foot stainless steel storage tank. Entirely automatic. Ideal for farms, rural homes, motor courts, camps, highway restaurants, etc. Used throughout the world. (Not a water softener or iron remover.) WRITE FOR FREE BOOKLET.

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Better Wiring Saves Laundry Time

"My clothes dryer turns off 20 minutes sooner now". That's the comment Mrs. LeRoy Comly of Buckingham Valley, Pa. made when asked what benefit she noticed from their better wiring program.

Mrs. Comly had been working under the same handicap that besets many housewives—inadequate wiring. While her electric conveniences worked well she did not realize how much better they would perform when backed up with good wiring.

In point of fact, it was Mr. Comly who began the investigation about better wiring. He wanted to be sure that the barn part of the farmstead was getting enough "juice". So Comly asked that a power company representative stop by the farm and give an opinion on the wiring.

He recommended that a 200 ampere service be placed at a central point and that the house, barn, and workshop services radiate from that central point. The house and the barn were each to be served by a 100 ampere service.

Comly did just that. Now there is enough power everywhere on the Comly farm. The barn lights are brighter, the motors run better and Mrs. Comly gets her wash day over sooner.

Improved wiring on the Comly farm resulted in brighter lights, better motor performance and, most important to Mrs. Comly, shorter wash days.

Cooking Electrically is "Tops"

These Women Know!

Here are some of the wonderful letters we received from farm women telling why they prefer an electric range. You have probably had some of the same experiences as these ladies. If you are now cooking with electricity, you'll no doubt agree with everything they say. But, if you have not yet made the "switch", other farm women's reasons for doing so will be of great interest to you.

Sheer Magic

By **MRS. ZULA HALL**
Crawford, Nebraska

When I married and came to live on the ranch my culinary education included a huge black range, forever in the need of polishing. I always looked as if I had been taking part in a minstrel show when I had finished the job. I became an expert at coaxing a semblance of heat from damp wood and from inferior coal—bought mistakenly in the interests of economy.

The kerosene stove which did duty through the summer months smoked and smelled; and the heat was so uneven my baking was a constant anxiety. It was not uncommon to have the oil run out in the middle of preparing a meal. And wouldn't you know—my husband had forgotten to take the empty can to town with him to be filled!

Bottled gas was an advance over these methods but, like the kerosene, it had a way of running out at crucial moments. So this, too, was far from ideal.

Our immediate family had grown to eleven when my husband decided to put in electricity and to install an electric range. That range was sheer magic. To be able to cook without ashes and soot was a tremendous boost to my morale, not to mention the increased efficiency and kitchen comfort.

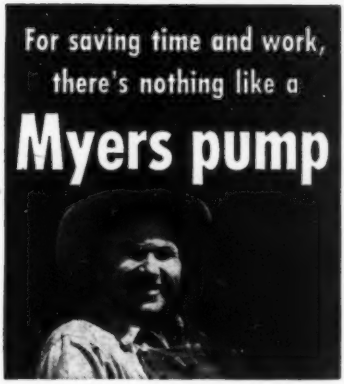
Now I no longer fear a fallen cake or an overdone batch of bread because of a miscalculated stick of wood, or a faulty burner. There is no dirty work of preparing a fire. Just a quick turn of a knob and there's my heat, at exactly the right temperature. And the results are as sure as two times two. Cooking the electric way is fool-proof. Even my youngest girls can prepare a quick and nourishing meal this "fun way." As for me—my electric range has taken all the discomfort, the anxiety, and the work out of cooking. Holidays are truly feast days, and my greatest praise is to hear, "Hey, Mom, when do we eat?"

Three "T's" of Electricity

By **MRS. FRIEDA M. LEASE**
Madison, Wisconsin

Like other busy farm wives and mothers, I believe farm women are entitled to modern appliances and improvements to

Mrs. Lease prepares the family dinner with the aid of a "good and faithful servant"—her electric range.



Now chickens, cows, beef cattle and even the dog get all the water they want automatically. With a high-capacity Myers pump and automatic watering devices, water can be made available to livestock whenever they want it. Dairy herds give more milk, chickens lay more eggs and beef cattle gain more weight on less feed when an adequate supply of water is always handy.

cutting labor builds profit—

Best of all, you never lay a hand on a pump handle. A Myers unit pumps more water in a few hours than you could pump and carry in a day. It allows more free time for profitable farm jobs.

makes housekeeping easier, too!

An automatic clothes washer, dishwasher or garbage disposer can eliminate hours of housework drudgery. But these work-saving appliances demand plenty of water and the kind of steady pressure a Myers pump delivers.

For as little as $1.50 a week, you can own a Myers water system. See your Myers dealer today for details.

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POWER SPRAYERS AND WATER SOFTENERS

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609 W. Lake St., Peoria 5, Illinois

make routine work easier and more interesting.

For 17 years, while I used a slow, unpredictable, woodburning cookstove, I dreamed and planned of how wonderful it would be when I could switch to an electric range—to prepare meals the modern, speedy way.

Then, 6 years ago, came a day to remember—the day my new electric range was installed. The 'big switch' improved the whole kitchen and was a better way of farm living for this family. My electric range has been a good and faithful servant ever since, helping me to turn out easier, better, and quicker meals.

Three T's are credited to my electric range:

1. *Time Saver.* Since cooking with electricity my kitchen working hours are shorter. No more overtime without pay in the kitchen like under the old system. Now, even when I oversleep mornings or come home later than usual from afternoon home makers meetings or shopping trips, I can still manage to get that meal quickly because the range does my hurrying.

2. *Temper Saver.* With the old wood stove the oven often got too hot or balked when I tried to get the temperature to a higher degree. This often resulted in either over-done or under-done baking which caused bad dispositions. To come in from outside and find the fire out entirely was nerve wracking, especially when the men were hungry and impatient for their meals. Cooking with electricity came to the rescue and tempers and tension have mellowed.

3. *Tidy.* In the wood-burning-stove days it meant tracking up the kitchen floor when carrying in wood. Ashes had a way of sifting all over the place. Carrying them out on a windy day always rated high on my list of pet peeves. Yes, 'ashes got in my hair'. But that's all done away with now. Gone too is that mean biannual job of cleaning out stove and pipes. Today cook and kitchen can be kept tidy—thanks to my electric range.

Plenty of water everywhere you need it with a power-packed

Rapidayton

WATER SYSTEM

Modern farms require **more water** in **more places**—under adequate pressure. You can rely on power-packed Rapidayton water systems, like the TWIN Champion shown here. It's a BIG, high-capacity system with TWO impellers. It actually loafs along while pumping full capacity at 40 lbs. pressure (compared to a loss of 50% to 80% in one-impeller pumps). Converts to shallow or deep wells; goes down to 150 ft. Assembled, ready to install, with horizontal or vertical tank. Exclusive Quick-Connect flange enables you to hook up with plastic or steel well pipe in a jiffy. See this pump at your dealer's. Write for free booklet, "What Kind of Water Pump Do You Need?"

MEETS FHA REQUIREMENTS

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Established 1908 as Dayton Pump & Mfg. Co.

I've Used Them All

By **MRS. OLIVER ENDSLEY**
West Branch, Iowa

I have tried several types of cooking heat, and it seems to me the one perfect type is so obviously electricity that I am amazed everyone who possibly can doesn't use it.

Growing up on a farm, I became an expert at firing our wood range. My mother allowed me to do a great deal of the cooking and I could get a booming fire, which really heated the oven and got performance. However, no matter how well I fired, it took undiminished attention to keep the heat up. The oven thermometer didn't mean much when it was difficult to fire to an exact temperature and then hold it there.

In hot weather we took our

Safe, automatic cooking is one of the main reasons Mrs. Endsley is so happy with her electric range.

food to the back porch where a smelly, temperamental oilstove did the cooking. The smell of kerosene lingered on our hands, the heat was slow and sometimes the burners went bad and wouldn't work.

Next I used city gas while sharing an apartment with my sister. The heat did not spread evenly under utensils, the burners were hard to clean, it was not safe to leave unattended. I constantly had a feeling that I was smelling gas.

After my marriage there was a time when I used my father-in-law's bottle gas stove. There were the same objections to this as to the city gas. It was slow, difficult to brown steak over, and almost impossible to go off and leave without coming home to a burned mess. Roasts left in the oven without watching would be dry and overdone, navy beans left steaming over a low flame with what seemed to be plenty of water would be found boiled dry after an hour.

It is no wonder I decided to use electricity when I bought my own equipment. For a number of years I continued to do office work and still managed my farm housework. Only another career housewife could appreciate what a satisfaction it was to prepare my dinner in the morning, and, with the advantages of controls and timing devices on my range, find everything just right upon my return. The heat was safe, even, dependable. The surface units and oven were easy to clean.

Later, with little heads and fingers coming just up to the range top, I was glad there was no open flame, nor matches around to be a menace, and that there would be no escaping gas. What a pleasure to heat small amounts of children's foods without danger of overcooking, thus destroying flavor, and precious vitamins and minerals.

For all the cooking, there is no more healthful way to preserve the natural wholesomeness of foods than with an easily controlled electric range.

Freeze Cheese

Have you tried freezing cheese yet? At least 10 different varieties of cheese have proven successful for home freezing.

Success depends on fast freezing and the cheese's composition. Your freezer temperature should be at zero°F. or lower. Pieces of cheese to be frozen should weigh less than one pound, as larger pieces become chalky looking, and may crumble when thawed. If the cheese is frozen too slowly, large ice crystals form which break up the curd and change the texture.

Some varieties of cheese that can be kept in freezer storage for six months include Cheddar, brick, Port du Salut, Swiss, Provoloni, Mozzarella, Liederkranz, Camembert, Parmesan and Romano. Blue cheese tends to become crumbly and mealy. If you plan to use it in salads or dressings, however, this crumbliness might be an advantage. Cream cheese becomes watery and mealy and is not recommended for freezing.

Before freezing cut the cheese into pieces, under one pound, or use packaged cheese. Closely wrap any cut cheese, such as Cheddar, in freezer-foil. Press the foil tightly to keep out the air.

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WAYNESBORO

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- Will never freeze when properly installed.
- Provides running water even in coldest weather.
- Assures Positive Fire protection.
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The handle in this position shows at a glance that the water is positively shut off and is your guarantee against freezing and leakage.

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Without Dangerous Poison Sprays or Dusts!

No shock to people or animals. Write for free literature.

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Flies, mosquitoes, roaches, etc. can't stay away from the INSECT ELECTROCUTOR . . . modern, electrical way to eliminate insects from homes, dairies, greenhouses, etc. Manufactured for over twenty years, so it must be good.

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INSECT ELECTROCUTOR is portable, easily attached wherever most needed. Operates on regular 110-120 volt A.C. current. Foolproof, all-metal construction, 24" x 14" x 5". Simply plug in.

Have comfortable, insect-free porch, rooms all summer . . . clear barns, sheds of disease-bearing insects. Just 30c a month to operate. Buy two . . . protect both home and barn. Mail check or money order to:

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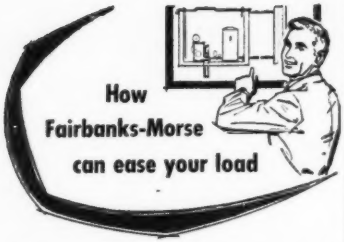

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REFERENCE INDEX

• Many of our readers save their copies of ELECTRICITY ON THE FARM Magazine for reference purposes. To help you find the answers to your questions and do it quickly, we have prepared an alphabetical index of the contents of this magazine by applications and products.

• We will gladly send you a copy upon request at no charge, as long as our supply lasts. Just drop a note to ELECTRICITY ON THE FARM Magazine, 305 East 45th St., New York 17, N. Y.

Spring Menu Dressing

Time to Spruce Up Winter-Weary Diets for a New Season

At this time of year, do you long to brighten every room in the house? Springtime brings with it the desire to put on a "new dress". To you it may mean painting the outside of the house, slip-covering the furniture . . . to many it means varying the menu by serving a favorite food with a new and tangy flavor. Have you considered adding a springtime touch to your menus by using sour cream as a recipe ingredient?

In the kitchens of Old Vienna, Hungary, Russia, and Bohemia cooks used sour cream with a liberal hand. It is a healthful food in itself and it adds zest to a variety of other foods. Stews, meats, pancakes, biscuits, waffles, cakes and cookies develop a tangy flavor when sour cream is added. Its food value is approximately the same as the sweet cream from which it is made.

As more homemakers have discovered this versatile food during recent years, its popularity has increased. Fresh Mushrooms in Tangy Sauce, served on toast points or fluffy rice will add newness to your spring menu planning. Add a generous serving of mixed salad greens and your Sunday night supper is complete.

Mushrooms in Tangy Sauce

2 tablespoons butter.
½ pound mushrooms, sliced
1 tablespoon flour
salt and pepper
1 cup sour cream

1. Melt butter in skillet.
2. Add mushrooms; cook until browned and tender.
3. Mix flour, salt and pepper with sour cream.
4. Add mixture to mushrooms and cook until heated through, about 5-7 minutes.
5. Serve over toast squares or fluffy rice.

(Serves 4)

One sure way to make your family marvel is to set a tempting hot bread before them early in the morning. You can bake delicious Marmalade Scone Whirl in the morning. The secret is planning.

Measure out all the ingredients the night before. Sift together the dry ingredients and cut in the shortening. Mix the egg and milk. Grease the pan, too, so it will be ready.

Then all you need to do in the morning is to finish mixing

Sew-Cool Fashions

9280—Flattering princess lines—perfectly proportioned for the shorter, fuller figure! A joy to sew—diagram shows how easy it is! Half Sizes 14½-24½. Size 16½ takes 4⅛ yards 39-inch fabric.

9121—This newest sheath frock is a sure flatterer—with novel "peekaboo" neckline above its sleek silhouette! Misses' Sizes 10-18. Size 16 takes 3⅛ yards 35-inch.

Send THIRTY-FIVE CENTS (in coins) for EACH pattern to: ELECTRICITY ON THE FARM, P.O. Box 42, Old Chelsea Station, New York 11, New York. IN CANADA: 60 Front St. West, Toronto 2, Ontario.

Add FIVE CENTS for EACH pattern for 1st-class mailing.

the coffee cake while the oven is pre-heating. Marmalade Scone Whirl bakes in just 20 minutes while you assemble the rest of the breakfast menu.

Marmalade Scone Whirl

- 2 cups sifted flour
- 3 teaspoons baking powder
- 1 teaspoon salt
- 1 tablespoon sugar
- ¼ cup shortening
- 1 egg
- ¾ cup milk
- 1½ cups marmalade

1. Sift together flour, baking powder, salt and sugar.
2. Cut or rub in shortening.
3. Beat egg and add milk.
4. Add egg and milk to flour mixture. Stir only enough to moisten flour.
5. Spread dough in greased 9-inch round pan. With fingertips press dough down in grooves 1 inch from edge of pan and second 1½ inches from first.
6. Fill grooves with marmalade.
7. Bake in moderate oven (400°F.) 20 minutes.

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Oshkosh Wisconsin

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No guess work . . . set the dial to desired temperature and electricity is automatically added to hold the heat set. Double cooking surfaces. Kitchens are COZY in winter—COOL in summer with America's finest and most beautiful MONARCH combination ranges. See your dealer today.

Monarch SINCE 1890

MONARCH RANGE CO.
7046 Lake Street
Beaver Dam, Wis.

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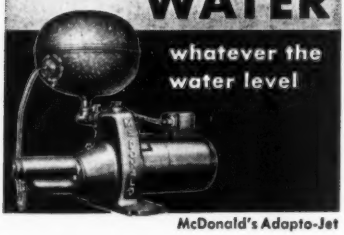

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for Junior Partners

4-H'er Has "Sharp" Idea

Lawn Mower Sharpening Project Proves Profitable for Dad and Lad

By U. R. CARR
and
HUBERT MATNEY

Oftentimes a boy and his 4-H project turns itself into something that Dad can take part in and profit thereby, especially after the project has been completed and earned the County Blue Ribbon. Such was the case of this 4-H member, Dean Hood, Milroy, Indiana.

Dean wanted something different for his project and at the same time something that would not be just another exhibit to be used at the Fair and later discarded. After much thought and consultation with the County Agent's office and the local power supplier's rural representative, he came up with a good idea and a good community project. With the present trend to power mowers, he knew that a small community of rural folks needed a local lawn mower sharpening business. He set to work getting the necessary parts together to make his exhibit for the 4-H electric project and ultimately his first business.

First of all, he had a portable ½ hp electric motor that he had used the previous year for his 4-H electric project fair exhibit. Now it could be used for the main source of power. He located a Model A Ford transmission at the local scrap yard, to serve as the power reduction gear to drive the various lawn mowers during the sharpening process. He then mounted these on an angle iron frame. He used a single V belt drive on a 1-inch pulley for the motor and 9-inch pulley on the transmission. A jig was made to handle the different width mowers and the one shown will take up to and including a 32-inch power mower. This unit is portable and can be used either inside or out to fit the occasion.

The complete cost was slightly less than $35, far less than a commercial outfit. Since it has developed into such an outstanding success he says, "I want other boys to realize the importance of the 4-H Electric Program and what it can do to inspire a profitable business for that extra spare time."

Dean Hood starting the lawn mower sharpener. The sharpening is done by running the mower reel in reverse, adjusting it so that it "drags" slightly on the bar, and applying an abrasive (valve grinding) compound mixed with oil.

Frances Likes Flowers

And Her Flowers Like Electric Heat

Frances Schwartz likes flowers. One might even say that flowers are her hobby. She grows flowers, transplants them, and pots them. Inside the farm house, for borders, alongside the farm pond—in fact just about wherever one looks—Mrs. Schwartz has flowers.

Last year her husband, George, thought, "Anyone who likes flowers like Frances does should have a little greenhouse". Then, because George transforms thoughts into action, he was soon deep into considerations of size, construction details and materials. He was surprised that the plans developed without serious problems—with one exception—heating.

Heating did pose problems. First there was cost. Furnaces, piping, radiators, valves, fuel storage, chimney—all these added up to a considerable expense. Then, there was the dehydration which takes place when the chimney flue is right in the greenhouse itself. To build a separate furnace building would have added greatly to the cost. In addition, and perhaps most important, a busy man has a limited amount of time to spend tending the furnace in a hobby greenhouse. What George really had to have was a heating system that would run itself.

This last item led the way to solving the heat problem, for when George thought, "What lends itself best to automatic operation", the answer was clear—electricity. The more he investigated electric heat the better it suited his needs—no chimneys—no fuel storage—no dehydration—no fire hazard. Electric heat was absolutely automatic and installation costs were lower than any other way.

So that was it. Schwartz built the little greenhouse 10 ft by 16 ft. with benches on either side of a center aisle. In it he put a 4000 watt, 230 volt portable electric heater with a circulation fan. Mrs. Schwartz loves it. She says, "I have more flowers, better flowers, less work and more pleasure". Schwartz added, "And that's not all, in my garden I'm 'way ahead this year because the plants I set out had such a good start. Why, I'll have tomatoes on the table soon."

When George commented on the garden with such enthusiasm it made one wonder what he built the greenhouse for—Frances' flowers or George's garden plants. Anyway they are both mighty pleased about the whole thing and that is what counts most.—BRUCE FEARN

Frances Schwartz poses in front of her little greenhouse. On a bench in the background is the portable 4000 watt electric heater. Thermostatically controlled, it handles the heating job without any trouble.

Strataflo

FOOT AND CHECK VALVES

Improve your water supply... save that well... with a Strataflo Foot Valve. End leakage troubles, save wear and tear on pump. It will save its cost in service calls it eliminates. Ideal for jet-type pumps.

Write for Bulletin 902.

STRATAFLO PRODUCTS, INC.
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Pumps 3000 GPH; 450 GPH 80' high or 1800 GPH from 25' well. Use 1/6 to ¾ HP motor. Coupling included free. Does not rust or clog! Postpaid if cash with order. Send for yours today!

MONEY BACK GUARANTEE

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- Cost-free conversion—all is furnished except pipe.

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DEMPSTER MILL MFG. CO.
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Leghorns, Austrawhites, Minorcas, $8.99; pullets $17.99; Rocks, Reds, Wyandottes, Hamps $8.99; pullets $15.99; Heavies $6.99; Mixed $5.99; Leftovers $4.99; Surplus $3.99; fob: catalog. 26 breeds, bloodtested.
BUSH HATCHERIES, 12, CLINTON, MISSOURI

4 EXTRA CHICKS, $2.99 100. BLOODTESTED AAAA, our choice. No Culls, Cripples. 30 breeds including Rocks, Reds, Wyandottes, Hampshires, Minorcas, Leghorns, Austrawhites, $8.99; Pullets, $13.99; Heavies, $6.99; Mixed, $5.99; Fryers, $4.99; Surplus, $3.99; Leftovers, $2.99. FOB. Catalog. Clinton Chick Store, Clinton, Mo.

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NAME_____
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Farm Seed Processing Pays

Price Differential Over Untreated Seed Soon Pays for Cleaning Unit

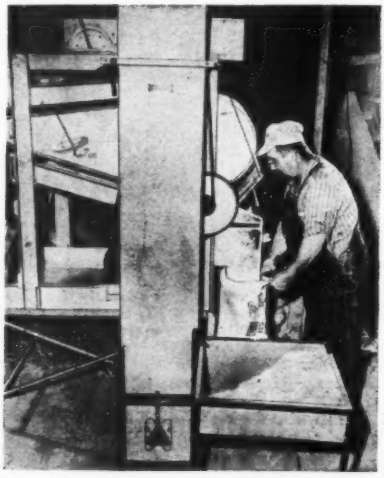
There was a time not too long ago when much of the 600 acres of farmland owned by the Loyd Faulkner family of Anniston, Alabama, was planted to cotton. During the depression era, cotton allotments forced Faulkner to seek some other use for much of his land and gradually his cropping system has been changed to one consisting principally of growing hay, legumes and fall grains. Faulkner maintains a herd of some 40 or 50 beef cattle, feeding them entirely from the farm production. He derives most of his income, however, from the sale of seed.

During the early days of his new system of farming, Faulkner attempted to sell his seed just as it was saved after combining. He soon found that the seed was just not bringing enough on the market to pay for the labor incurred in production. Then he began to have the seed cleaned in a neighboring commercial plant for a nominal fee. This helped the situation materially, but he figured that he was still paying much of his profit to someone else for cleaning and treating his seed.

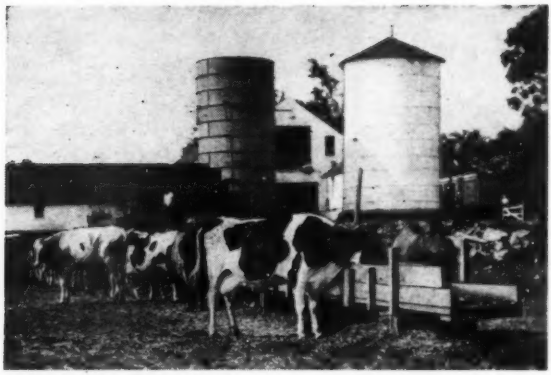
After another season, he tried another method. He rented a machine to do the work. This was more satisfactory, but he reasoned that if someone else could make money by renting a machine or by doing the work on a "custom" basis, he should be able to make a machine pay its own way.

In 1951 Faulkner bought a small commercial seed cleaner. While the machine will not handle all types of grains, it handles the oats, wheat, barley, rye and clovers which make up the majority of the legumes and fall grains grown on the Faulkner farm. It cleans, grades, and dusts the seeds in one operation. This seed processing goes a long way toward making up the price differential once suffered by Faulkner from having untreated seed. Faulkner states that the machine paid for itself during the first two years of operation.

WALTER L. BAKER, JR.



Faulkner removes a sack of seed from his cleaner. The seed has been cleaned, graded and dusted in one operation, and is ready to bring bigger profits at market.



Barn Cleaner Goes to Pasture

Seasonably Idle Equipment Put To Work Feeding Cows

We're sold on zero grazing," says Herbert Bates of Carlisle, Mass. "We can get a higher, more uniform milk production. No fence fixing or wasting time driving cows back and forth to pasture either."

Zero grazing is nothing new to this farm operated by Richard Bates and his two sons, Richard Jr. and Herbert. It's only the way they do it. Only a few years back the cows stayed in the barn and had their green feed delivered daily throughout the summer months. These dairymen noticed their cows got restless and a dairy expert suggested exercising them by pasturing. They gave it a try but didn't like it one bit. Then they came up with the idea of sending their barn cleaner to pasture.

Their zero grazing system hinges around the fact that this farm has two barns equipped with gutter cleaners, one barn for dry cows and the other for milkers. During the summer the dry cows went to pasture and one barn cleaner went unused. "Why give the cleaner a vacation?" they asked themselves. "Why not put it to use?"

That is exactly what they did. They built a 175 foot feed bunk in the exercise yard near the milking barn and installed the gutter cleaner in it. The 2 hp electric cleaner motor was unbolted from its place in the barn and, with the aid of a tractor scoop, shifted over to a platform at the end of the feed bunk.

To facilitate filling the bunk with freshly chopped grass, these dairymen built a large wooden chute, on a steep incline, with the lower end resting against the trough. Directly after the morning milking when the cows come outside, the Bates dump a 3 ton load of freshly chopped grass in the chute, pull a switch, and the barn cleaner paddles distribute the grass along the bunk. The cleaner is stopped when one-half of the feed is spread out. Approximately 1½ loads of feed are fed out daily and the cleaner is operated four times daily to keep the bunk evenly filled.

This zero feeding arrangement has done an excellent job for these dairymen. Furthermore, by placing this seasonally idle piece of equipment to use during the summer months, they are deriving maximum benefits from their investment.

C. L. Stratton

PASTEURIZE RAW MILK

- IN THE CITY IT'S A LAW
- ON THE FARM IT'S A MUST

Only through pasteurization can you positively protect your family from diseases spread through raw, unpasteurized milk —such as undulant fever, typhoid fever, strep sore throat and polio. Just testing cows won't do it. City residents are protected by laws requiring dairies to pasteurize milk. You can give your family this same advantage in your own home.

HOME HEALTH HOME PASTEURIZERS

MAKE MILK SAFE TO DRINK

EASILY, QUICKLY, AUTOMATICALLY

FOR LARGER FAMILIES. A two gallon pasteurizer that's compact and light-weight. Positive bacteria kill without loss of flavor. Dual heat principle. Just turn it on . . . it's automatic. Priced at 36.50

FOR SMALLER FAMILIES. Popular one gallon size gives same positive pasteurization. Accurate timer-thermostat. No watching or stirring. Convection Heat Principle. Both models guaranteed for one year . . . Underwriters approved . 1 gal. size, 27.50

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BELLE CITY ENGINEERING, RACINE, WIS.

Progress Report

. . . . . (Here from page 7)

ments, air velocity, static pressures encountered, rate of loading hay into mow, moisture content of hay when placed on drier and the amount of mow ventilation that must be provided to exhaust moist air out of the barn. The same precautions also have to be taken against roof leaks or air losses through mow floor or along pillars, beams, braces, stairways, hay chutes and other obstructions.

Vertical duct systems are used in high storage structures. The vertical flues can be fabricated on the farm or prefabricated ducts are available.

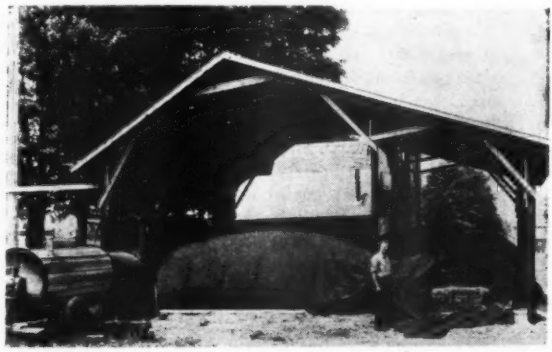
Most of the above mentioned duct systems are suitable for drying chopped or long hay. However, the slatted floor and the rectangular duct systems are best suited for drying baled hay. In order to dry baled hay, the air has to be forced through the bales which requires that the square bales be interlocked the way masonry blocks are layed in a wall. Round bales should simply be stacked like drain tile. After the bottom layer is in place, each bale of the next layer fits nicely between each two bales of the first layer.

Batch Drying

Presently, there is a growing interest in batch drying. This type of drying is particularly adaptable to baled hay. There are two general types of batch driers; namely, wagon driers and small batch driers. With either type, heated air is usually used in order to reduce the drying time to a minimum.

Several manufacturers build wagons designed especially for drying. These wagons usually have a perforated steel bed with a steel air tunnel under it. A 5 hp heated air crop drier will usually supply sufficient air for three such wagons. Small batch driers are usually a small mow or dock with a slatted floor on which the baled hay is placed and dried within a few hours. It is then removed and hauled away to a permanent storage.

Heated air batch driers



Batch drying is growing in popularity. Here, a dock type batch baled hay drier uses heated air drier connected to side main slatted floor duct system. Bales are moved to storage mow after drying.

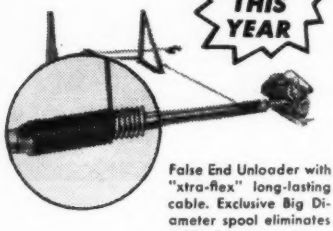
UNLOAD FOR LESS

with a

Flinchbaugh

Low initial cost—low upkeep because of exclusive design features by Flinchbaugh —the pioneer in wagon unloaders.

NEW THIS YEAR



False End Unloader with "xtra-flex" long-lasting cable. Exclusive Big Diameter spool eliminates cable damage.

This is only one of the famous Flinchbaugh Unloaders. Canvas type and chain pull false ends also available.

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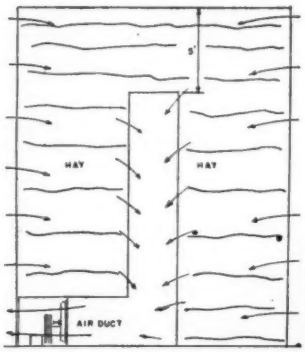
usually use vertical, single pass heated air for drying. Some batch driers have recently been designed in such a way as to make recirculation of the heated air possible, thus making it possible to dry the hay more uniformly. This is accomplished by pushing the air through one



Cross section of vertical duct system showing air movement. Vertical duct can be closed off at various heights to permit drying before entire structure is filled.

batch of bales, about 4 bales high, and pulling it through a second batch 4 bales high, effectively making it equal to a batch 8 bales high. Since one side will be wet and the other partially dry, the air can always leave the drier from the wet material and thus be close to saturation. By reversing the direction of the air through the two batches, advantage can be taken of the counter flow principle (introducing low moisture air to dry material and leaving from wet material). Such a system is more efficient but requires a more elaborate installation and more time in placing the bales on the drier. It also entails added attention for reversing the direction of air flow.

We can expect further improvement and simplification in hay drying equipment to be developed but it is gratifying to know that the older installations are also efficient and still giving satisfactory service.

Barn Cleaner Anticipation

When dairyman Bernard Shaw of Salsbury, N. H. built his new dairy barn, he decided to wait a year or so before installing an electric gutter cleaner. He saved money by laying out a trough for the gutter cleaner around the ends of the barn and covering it with a temporary covering of turkey wire topped with a thin coating of concrete.

His regular gutters are the correct width for a gutter cleaner. When his new cleaner is delivered, all he'll have to do is break out the thin coating of concrete and wire. His troughs are already made, saving him money and time when otherwise he'd rip up a concrete floor.

Shaw points to the thin layer of concrete he will break away to install cleaner.

You can actually install this water system yourself!

- **It's complete**
- **It's dependable**
- **It's inexpensive**

Berkeley
Water-Mate

Water Mate is a complete packaged water system—ready to install—*no parts to buy!* You can actually carry it home—install it yourself—and you've got a dependable supply of water under pressure for all your home and garden needs.

The Water Mate is convertible from shallow well to deep-well pumping. No parts to buy or exchange needed to make conversion. Water Mate will pump water for you from depths up to 50 feet.

Go to your nearest Berkeley Pump dealer today and have him tell you all about the Water Mate.

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No. 646 complete with 5 HP electric motor and switch.

All you buy is this powerful fan and our patented pressed steel duct frames. Using your own spare lumber, one man can assemble entire system in a half day.

Duct frames on 2' centers.

NO NAILS - NO BOLTS

It'll sure pay you to look into this today.

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Bulk Tanks Increasing

Bulk tanks have replaced the old milk can on at least 15,000 U. S. dairy farms. Most of this chore saving change has taken place since 1951, as stated in a recent USDA report.

According to economists at South Dakota State College, the break-even point on whether to use the can or bulk system is about ten cows producing 8,000 pounds of milk annually.

Questions and Answers

Water Valve

▶**Question:** *Is there any way that we can shut off the water in our poultry house each night, similar to the way in which we control the hen house lights?*

W. M., New Jersey

▶**Answer:** Yes. You can obtain a valve that is operated by an electric solenoid. This can be connected in such a way that when the poultry house lights go off at night, the valve shuts off the flow of water. You should be able to obtain such a valve from local plumbing dealers.

Dehorning Calves

▶**Question:** *Will a young calve's horns stop growing if they are burned with electricity?*

W.R.R., Kentucky

▶**Answer:** Yes. However, there is no current passed through the horns. The dehorning is accomplished by means of an electrically heated iron, similar to a soldering iron, which has a hollow tip to fit over the horn bud and sear the base of the horn at the hairline.

Does Heater Vaporize Water?

▶**Question:** *I have a 50 gallon water heater. Would this evaporate enough water to cause the pump to run during the night?*

E.A.F., Indiana

▶**Answer:** No. The water heating tank is part of a closed system and offers no opportunity for the water to evaporate. What's more, the normal tank setting is approximately 150°, which is considerably below the boiling point of water. If your water pump runs during the night, it is probably due to leakage somewhere in the system.

SODDEN THOUGHT: Never let the grass grow under your feet —it TICKLES! . . . . First Little Girl: "What comes after the letter T?" Second Little Girl: "V." This was the same little girl who described a DREAM as "TV while you're sleeping." . . . . In TRADE WINDS, Bennett Cerf recounts that Hector Nussbaum, noting that his son was absorbed in a book about Custer's last stand, proposed, "I'll teach you to talk like an Indian if you'd like." The skeptical son asked, "HOW?" "See," beamed Papa Nussbaum, "you're LEARNING already." . . . . . SNOB: a person who wants to know ONLY those individuals who DON'T want to know him . . . . After all, a BILLIONAIRE is only a MILLIONAIRE after he pays his taxes . . . . FAX DEPT.: The penitentiary publication at Joliet's STATEVILLE prison is named, quite appropriately, "TIME." . . . . A real estate agency near Chicago displays this sign, "SPEND a LITTLE, GET a LOT." . . . . . ECONOMICAL is the wifie who uses only 28 candles on her FORTIETH birthday cake . . . . PAROLE: a CELL-OUT . . . . RIDDLE-OF-THE-MONTH: Know what the KEY said to the KEYHOLE? ANSWER: "WHAT do ya hear from the KNOB?" (Caw! Caw!) . . . . JINGLEJOLLY DEPT.: "Mary had a little lamb, The lamb had halitosis, And every place that Mary went, The people held their nosis." (Author Unknown) . . . . PATIENT: "What would cause a constant buzzing in my ears?" DOCTOR: "Are you MARRIED?" . . . . COLLEGE MAN: "When I read of the marvels of electricity it makes me stop and think." CO-ED: "Yes, it IS wonderful what ELECTRICITY can DO." . . . . UTILITY POLE: a tall object that NEVER strikes a car except in self-defense . . . . EVERSTOPTOTHINK?— Many a man is a PESSIMIST because of the TAXES the OPTIMISTS have loaded on him . . . . PARTING THOUGHT: A TACTFUL girl is one who makes a SLOW BOY think he's a FAST WORKER . . . . Your pun-peddler —DUFFY.

In this issue . . . and in the May and June-July issues of

ELECTRICITY ON THE FARM *Magazine*

LOOK FOR THESE IMPORTANT FEATURES!

The issue in your hands brings you more on

MOTORS—your current chapter is on "Installation." To come: the final chapter on "Motor Maintenance"—appearing in May.

CROP DRYING—help on how to dry your particular crops faster and maintain quality, with even more on the subject in May and beyond.

ELECTRIC RANGES—this month covers safety factors, and the months ahead will continue with why and how you can get better performance from your electric range.

The May issue (published during National Water Systems Month) will bring you such articles as

HOW TO MAKE YOUR FARM WATER SYSTEM MORE EFFICIENT—covering water use, and accessory equipment that makes a water system complete.

HOW TO REAP MAXIMUM BENEFITS FROM AUTOMATIC HOUSEHOLD EQUIPMENT—again covering water use and water softening, filtering, heating, and dish and clothes washing.

HOW TO COOL POULTRY HOUSES WITH SPRINKLER SYSTEMS—still more on water use . . . an article that leads to a sequel appearing in the June-July issue:

HOW TO COOL BEEF CATTLE SHELTERS WITH SPRINKLER SYSTEMS

Watch for your May and June-July issues of

ELECTRICITY ON THE FARM Magazine

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Mr. H.N. Young,
Director, Agric. Exp. Sta.,
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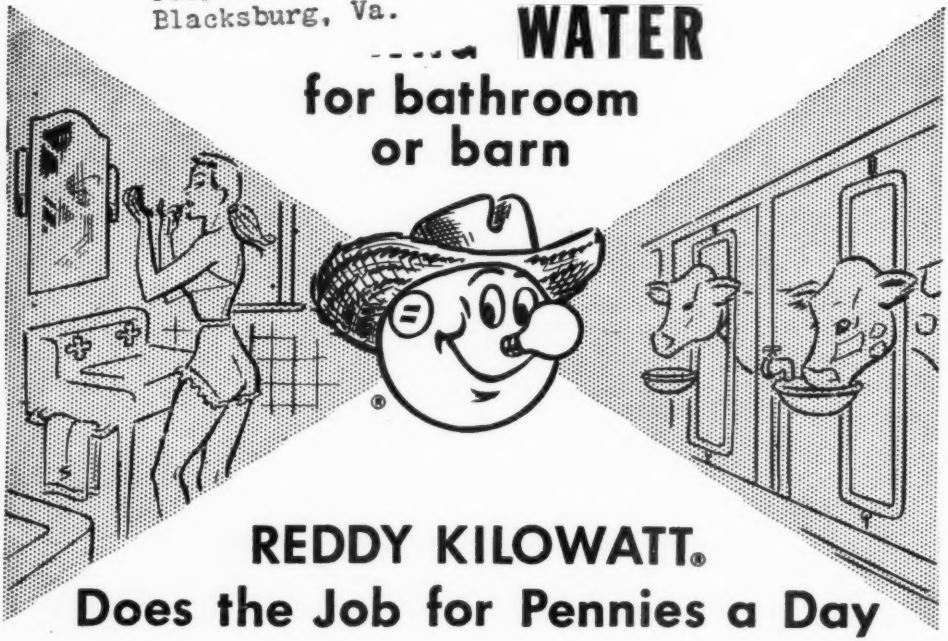
WATER
for bathroom or barn



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